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SEP 16 2005

IN REPLY
REFER TO

DNSC-OL

Subject: Updated storage manual appendix 4-A for mercury

To: DNSC-OL, DNSC-C, and DNSC-E

Discussion: DNSC has recently over packed all the stockpile mercury to ensure that no mercury will be released into the environment. This packaging project necessitated the update of the storage manual. Please add this section to your printed storage manual. This is also your authority to remove the current section on mercury in appendix 4-A. As always the most up to date version is on www.iamthekey.com.

Lance Kualii
Director of Stockpile Operations

Coordination:

a) DNSC-OL		Date	9/7/05
b) DNSC-E		Date	9/8/05
c) DNSC-G		Date	9-15-05

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APPENDIX 4-A

STORAGE OF MERCURY

1. Description

Mercury, also called quicksilver, is a metal that is liquid at ordinary temperatures. It has a silvery-white color and a high luster.

2. Packaging

The mercury is packed in cast iron or steel flasks securely stoppered with a screw plug to prevent leakage. Flasks may vary considerably in size and shape but each flask normally contains 76 pounds net of mercury. The DNSC has recently completed the overpacking of all of the stockpile mercury to ensure that mercury will not be released into the environment. The packaging configuration is six, 76-pound steel storage flasks, placed upright inside 30-gallon, 16-gauge steel drums with a 6-mil plastic bag, absorbent pad on the bottom of the drum and cardboard dividers between the flasks as cushioning. A steel drip pan 48"x 48" is placed on a two-way; flush; non-reversible; 48" X 48"; group III; hard wood; four-stringer pallet. Five drums are placed on each drip pan. The storage of Stockpile mercury will be in a specially prepared, secured warehouse.

3. Marking

Each flask was stenciled or has a non-ferrous metal tag firmly wired to its neck showing the original government purchase contract number, lot, container number, country of origin, and the gross, tare, and net weights. Markings for drums containing mercury flasks have country of origin, number of flasks, and net weight.

4. Storage

- a. Mercury should not be stored in the same warehouse section with other material.
- b. Leaking containers must be replaced and the mercury reflasked before the mercury is placed in permanent storage. Should a leak occur during storage, the mercury shall be recovered and filtered through cheesecloth into a flask or flasks stenciled "Mercury from Leakers" to distinguish it from that in original flasks. Note Section 5, PRECAUTIONS TO BE TAKEN. Any increase in the number of flasks resulting from an accumulation of mercury from leakers, should be reported on DNSC Form 42, Receiving Report. No increase in weight should be recorded as this weight is already accounted for in the original receipts of the mercury. When leakage is detected, the Directorate of Stockpile Operations and the Directorate of Environmental Management shall be notified.
- c. To facilitate the taking of a physical inventory at any time by count and computation, each drum shall contain six flasks except when fewer than six flasks

APPENDIX 4-A

STORAGE OF MERCURY

of the same origin are available. Each drum is labeled to indicate the number of flasks contained within.

- d. The storage layout for a pallet is 16 square feet. The recommended layout is as follows:
- Storage area locations for pallets shall be in uniform back to back rows along the length of the storage area.
 - Rows shall be placed with a minimum aisle space of 3 feet along the walls.
 - Aisle width between each set of back to back rows shall be sufficient to provide easy access for a forklift, emergency response equipment, etc.

5. Precautions to be Taken

- a. Health- Elemental mercury can be taken into the body by inhaling mercury vapor, absorption through the skin, or ingestion by mouth, and these can result in acute or chronic illness. Therefore, personnel in mercury storage areas must take special precautions. Follow DNSC Occupational Health Guidelines for mercury located at www.iamthekey.com.
- b. General
1. The storage site for mercury should be in an area apart from materials such as food for humans or animals, products for biological use, medical supplies, clothing, or other materials, which might become contaminated.
 2. Although packaged and contained mercury is not a health hazard, mercury that has escaped into the room through obvious leaks or spills or has previously been absorbed into the floors and walls does represent a potential hazard. Under these conditions the concentration of mercury vapor in the air may exceed the standards of good industrial practice guidelines such as Threshold Limit Values (TLV) of 25,000 ng. promulgated by the American Conference of Governmental Industrial Hygienists.
 3. Meticulous housekeeping procedures shall be enforced to prevent the absorption of mercury into the floors and walls of the buildings and to prevent the accumulation of hazardous concentrations of mercury vapor in the storage area. Should a leak or spill occur, it shall be cleaned up immediately. Small quantities of mercury may be collected by a capillary tube attached to an aspirator bottle. Larger spills require a mercury vacuum. Care must be exercised to prevent spilled mercury from entering a water drainage system.
 4. Walk-through inspections, when no appreciable amount of time is to be spent in the mercury storage area, are not considered hazardous to personnel. If personnel are to spend any greater length of time in the area, the space must be sufficiently ventilated to ensure the mercury vapor

APPENDIX 4-A

STORAGE OF MERCURY

concentration does not exceed the DNSC action level for mercury of 25,000 ng. Under the direction of DNSC-E, mercury storage areas shall periodically be tested with a mercury analyzer to determine the mercury content in the air in accordance with the environmental inspection plan. The results of the tests will be furnished to DNSC-O and DNSC-E.

5. Personnel performing repackaging, reflasking, or cleanup operations shall be provided with appropriate safety equipment and clothing, including:
 - a. Half facepiece, dual cartridge respirator with NIOSH approval for mercury.
 - b. Mercury impervious coveralls with hoods and booties
 - c. Nitrile gloves
 - d. ANSI approved safety shoes
 - e. Safety goggles or glasses with side shields
6. There shall be no eating, drinking, or smoking in the work area. Personnel leaving the work area shall wash with hot water and soap and change clothes.
7. As mercury is a toxic metal, firefighting personnel and others who may have to enter the mercury storage area under fire conditions, must be cautioned that highly toxic mercury vapor may be present. Caution placards shall be placed on all entryways into the mercury storage areas. Each entrance into a mercury storage area shall be marked:

“CAUTION”

MERCURY, METALLIC

Highly toxic by skin absorption

And inhalation of fume or vapor

Reference: DNSC Occupational Health Guidelines-Mercury, Revised
January 15, 1997, page 5, paragraph 1

Environmental Inspection Plan For Mercury in Storage

1.0 Problem Definition and Background

At room temperature, mercury is a shiny, mobile liquid metal, silver white in color and is slightly volatile. Liquid mercury and mercury vapor pose a health hazard if sufficient quantities are inhaled, ingested or absorbed through the skin. After absorption, the blood carries elemental mercury to the central nervous system where it may cause damage.

APPENDIX 4-A

STORAGE OF MERCURY

2.0 Purpose of the Environmental Inspection Plan

This Environmental Inspection Plan has been prepared to improve the inspection and reporting process for the mercury storage area and to document and support the correct storage and control measures of mercury required for the protection, safety and health of workers, the public and environment.

3.0 Environmental Protection Specialist

The duties of the Environmental Specialist are to conduct and report measurements of mercury vapors in the air and visually inspect for metallic mercury on the floor, drip pans, pallets, or drums. The inspection tag information will be completed after each inspection. The inspection report will utilize the mandatory fillable Excel format provided on December 22, 1999. All reports will be concise, factual, and reflect the storage conditions. All reports shall be transmitted electronically to a Headquarters Environmental Protection Specialist.

4.0 Inspection Equipment Required

Direct reading mercury vapor monitor, high intensity portable lights, and personal protective equipment such as protective clothing and a respirator with mercury filters.

5.0 Operational Procedures

The Directorate of Environment will assign a qualified Environmental Protection Specialist or equivalent to perform the inspection. A Headquarters Environmental Protection Specialist will review the inspection report prior to distribution and complete a memorandum of concurrence for all corrective actions. The Director of Environment Management will review all memorandums of corrective action prior to distribution. The Headquarters Environmental Protection Specialist will electronically transmit all reports and memorandums to the respective Distribution Facility Manager, the Chief of Operations Division, and the Chief of the Environmental Management Division.

5.1 Frequency of Inspections

A normal inspection level is defined as one inspection per month. A reduced inspection will be one inspection each six months. A tightened inspection is defined as one inspection per week.

Normal inspection to reduced inspection will occur when four consecutive normal inspection cycles do not detect any visible mercury or mercury vapors at or above the DNSC action level of 0.025 mg/m^3 (25,000 nanograms/ m^3),

APPENDIX 4-A

STORAGE OF MERCURY

Tightened inspection will occur when one inspection detects visible mercury or mercury vapors in excess of 0.025 mg/m^3 (25,000 nanograms/ m^3) and will continue until any visible mercury is cleaned and mercury vapors are reduced to less than 0.0125 mg/m^3 (12,500 nanograms/ m^3),

Normal inspection frequency will resume when two tightened inspection cycles do not detect visible mercury or mercury vapors in excess of 0.0125 mg/m^3 (12,500 nanograms/ m^3).

5.2 Temperature, Barometric Pressure, and Humidity

On the day of the inspection the inspector will document the inside and outside temperature for the Depot. This information will be documented in the inspection report.

5.3 Vapor Monitoring

A direct reading mercury vapor monitor with detection limits at 0.001 mg/m^3 (1,000 nanograms/ m^3) shall be utilized to record the levels of mercury vapors in the warehouse air. A total of four air samples will be taken in each inspection aisle, two at the breathing zone and two at the floor level. The samples will be taken at random locations in the inspection aisle. The sample shall be documented on the attachment portion of the report. If all of the samples are under 0.025 mg/m^3 (25,000 nanograms/ m^3), DNSC action level, no action is required. If any reading is found to be above the DNSC action level, an investigation of the storage will be initiated to determine the cause. Corrective action will take place to reduce mercury vapors in the air to below the DNSC action level.

5.4 Visual Inspection

The mercury storage warehouse and storage aids will be visually inspected using high intensity lights. The floor, drip pans, pallets, and drums will be thoroughly visually inspected for mercury. If mercury is found, the source of the spill shall be determined. The spill shall be cleaned up and the cause of the spill shall be determined so that similar problems can be minimized or eliminated.

5.5 Documentation and Records

Depots storing metallic mercury were provided an inspection-reporting format on December 22, 1999. The documentation of the inspection will be completed on the DNSC Form 30 which includes an attachment described in the instruction page of the form. All reports will be concise, factual, and describe the storage conditions. All reports will be transmitted electronically to the Depot Manager, as well as DNSC's Chief of Operations and Chief of Environmental Management Division.

APPENDIX 4-A

STORAGE OF MERCURY

5.6 Corrective Action

The Environmental Protection Specialist or equivalent will consult with the Headquarters Environmental Protection Specialist and the responsible Distribution Facility Manager to determine best corrective action. The Headquarters Environmental Protection Specialist will document the corrective action concurrence in memorandum format and follow-up on the corrective action weekly until the corrective action is completed.

6. Average Storage factor

- a. Volume: 18 Net cubic feet per short ton
- b. Square Feet – 5.6 gross square feet per short ton

FOR ADDITIONAL INFORMATION ON THIS COMMODITY REFER TO THE SAFETY DATA MATERIAL SHEET OR THE MOST RECENT PURCHASE SPECIFICATION.